CALIFORNIA CONSUMERS' GUIDE TO COMMUNITY WATER FLUORIDATION:

A QUESTION AND ANSWER GUIDE FOR CITIZENS, PUBLIC OFFICIALS, AND THE MEDIA

© Michael W. Easley, D.D.S, M.P.H., President & Chief Executive Officer, International Health Management & Research Associates; and Director, National Center for Fluoridation Policy & Research

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INTRODUCTION

Community water fluoridation has been utilized for more than half a century as the principle public health measure to prevent the ravages of a common disease known as dental decay. Also known as dental caries, dental decay is a disease that ultimately results in the formation of dental cavities and can lead to dental infections (abscesses), loss of teeth, massive general (systemic) infections, and occasionally death. The treatment of dental decay also results in substantial direct and indirect costs to individuals, employers, insurance companies, consumers, and taxpayers. Community water fluoridation is one of the safest, most effective, and most economical programs that public officials can provide for their constituents in order to prevent the pain, suffering, and costs of dental decay.

Community water fluoridation is generally easy and inexpensive to implement - costing public water systems, on average, about 50 cents per person per year to operate[1-2]. The return on investment is tremendous - more than $80 in dental treatment costs being avoided for each dollar invested in community water fluoridation[2]. Few health activities, and even fewer publicly financed programs, result in such a large amount of savings to consumers, taxpayers, insurance companies, and employers. Moreover, fluoridation has proven to be a safe, effective, efficient, economical, and environmentally sound means to prevent dental decay in children and adults. The implementation of community water fluoridation by public and private water systems serves as an excellent example of good public policy at work. Former U. S. Surgeon General C. Everett Koop has frequently stated that, ***"Fluoridation is the single most important commitment a community can make to the oral health of its children and to future generations."***

What Is Fluoride And Why Is It Necessary?

Fluoride is a naturally occurring substance that is present in virtually all sources of drinking water in the United States. It serves as an essential trace element necessary for the proper development of teeth and bones, and for the protection of teeth once they have erupted into the mouth. Therefore, fluoride not only benefits children before their teeth have come in, but it also protects the teeth of children and adults after all of their teeth are present in the mouth. Those fortunate enough to have had access to community water fluoridation experience 40-60% fewer dental cavities[3].

What Is Community Water Fluoridation And Why Is It Important?

Community water fluoridation is the precise adjustment of the existing naturally occurring fluoride levels in drinking water to a safe level that has been determined to be ideal for the prevention of dental cavities in children and adults. As previously mentioned, virtually all sources of drinking water in the United States contain some fluoride naturally. There are even some locations in the United States where naturally occurring fluoride levels are adequate for the prevention of dental cavities - these communities do not have to fluoridate their drinking water. However, most communities in the U. S. have insufficient levels of fluoride for effective prevention of dental decay. Therefore, these communities with insufficient naturally-occurring fluoride in their water require the addition of very small amounts of fluoride to achieve the optimal level for good health.

Community water fluoridation mimics a naturally occurring process and can be considered to be a form of enrichment or supplementation of the drinking water. Moreover, the concept of fluoridation as a measure to prevent dental decay is very similar to the supplementation of: milk and breads with Vitamin D to prevent rickets; fruit drinks with Vitamin C to prevent scurvy; table salt with iodine to prevent goiter; breads and pastas with folic acid to prevent certain birth defects; and cereals with many different vitamins and minerals in order to provide for proper human development and to promote good health.

Why Use The Public Water System To Provide Fluoride?

First of all, public water systems have been used for the purpose of preventing diseases in the United States since the 1840's. The original reason for the establishment and widespread use of community water systems by cities and villages was to prevent the outbreak of serious diseases like cholera, hepatitis A, and typhoid fever. Many other diseases, including dental cavities, are prevented through the treatment of drinking water. Water treatment for disease prevention is considered to be a primary public health activity and is essential for the control of many diseases that would otherwise plague modern society.

Don't We Have Other Ways Of Getting Fluoride?

There are other ways to provide fluoride, but none are as effective as community water fluoridation for the prevention of dental decay in children and adults[4-9]. Fluoride benefits teeth in two general ways - there are (1) systemic benefits and (2) topical benefits.

(1) Systemic Benefits of Fluoride: Systemic benefits are gained when one drinks water and eats foods that contain fluoride. Systemic benefits can also be obtained by taking fluoride tablets or vitamins with fluoride that have been prescribed by a family's physician or dentist. More permanent in nature, the fluoride obtained from systemic sources actually becomes part of the tooth structure as baby teeth and permanent teeth develop under the gums of infants and children[4]. These teeth are then considerably stronger and resist dental decay much better once they have erupted into the mouth. This protection, gained from getting fluoride from systemic sources, generally stays with the teeth throughout life.

Systemic sources of fluoride also benefit older children and adults[4-5]. Fluoride from food and drink eventually ends up in a person's saliva. The fluoride in the saliva constantly bathes the teeth so that the teeth are protected continuously with low amounts of fluoride. For those older children and adults fortunate enough to live in fluoridated communities, this constant protection of the teeth by saliva containing small amounts of fluoride is substantial[5]. The fluoride from saliva not only prevents some cavities from ever starting, but it also repairs early dental decay through a process called remineralization[5]. With remineralization, some very small cavities are not only prevented from getting larger, they actually can "heal" or repair themselves because of the action of low levels of fluoride present in the saliva[5].

It should be noted that community water fluoridation is much more effective, much safer, and much more economical than the use of prescribed fluoride supplements (fluoride tablets or fluoride vitamins)[4-9]. Community water fluoridation is always the best choice to prevent dental decay in children and adults, not only because it is safer, more effective, and more economical, but because it benefits all people using the public water system, regardless of age, race, ethnic background, or socioeconomic status[4-9].

Fluoride tablets or vitamins with fluoride can and should be used in the absence of community water fluoridation, but are meant only as a temporary substitute until a community's water system can be fluoridated. Because they must be prescribed by a physician or a dentist, fluoride tablets or vitamins with fluoride often are only available to people fortunate enough to be able to afford regular visits to a family dentist or physician.

(2) Topical Benefits of Fluoride: Topical benefits, on the other hand, are temporary benefits that are gained when fluoride from external sources comes into direct contact with the surfaces of the teeth[4,8]. Topical benefits can be

obtained through use of such things as fluoride toothpaste, fluoride mouthrinses, and fluoride treatments that are provided in dentists' offices.

Fluoride toothpaste do a great job in helping to prevent dental decay, but only provide a temporary topical benefit to the tooth surfaces. Fluoride toothpaste, by themselves, also do not prevent decay as well as fluoride from the previously mentioned systemic sources[3-4,6-8]. Readily available from grocery stores, drug stores, and other commercial establishments, fluoride toothpaste are safe and should be used according to directions on their labels. Fluoride toothpaste can be used by children and adults in areas served by fluoridated community water systems and do provide additional protection to teeth.

Fluoride mouthrinses are effective in preventing dental decay, but also only provide a temporary benefit and are not as effective as fluoride from systemic sources[3-4,6-8]. They are available over the counter (grocery stores, drug stores, etc.) or by prescription from dentists and physicians. Fluoride mouthrinses may be used at the same time that people are getting fluoride from systemic sources (community water fluoridation or fluoride tablets/vitamins with fluoride), however fluoride mouthrinses should only be used in these situations after consulting with the family's dentist or physician.

Fluoride treatments from a family's dentist also provide a temporary topical benefit to the tooth surface[4, 6-8]. These topical fluoride treatments may be used at the same time that an individual is receiving fluoride from systemic sources, but only if the dentist has determined that there is a need for a fluoride treatment because of the level of decay present in that individual.

It is important to remember that fluoride from topical sources, while effective in preventing dental decay, is not nearly as effective as fluoride from systemic sources[4,8]. Moreover, fluoride from topical sources should never be considered to serve as an adequate substitute for fluoride from systemic sources. The gold standard for dental disease prevention is community water fluoridation[4,8]. Community water fluoridation should be implemented whenever it is technically feasible. Fluoride tablets are meant to be used as a temporary substitute for community water fluoridation only until a community water system can be fluoridated. Topical sources of fluoride (fluoride toothpaste, fluoride mouthrinses, and fluoride treatments provided in dental offices) are only meant to be used as adjuncts to systemic sources of fluoride.

How Much Fluoride Is Added To The Drinking Water?

Only a very small amount of fluoride is added to the drinking water to achieve the desired maximum benefits. The existing natural fluoride levels in drinking water supplies are adjusted slightly in order to raise them to between 0.7 and 1.2 parts per million[10]. This very small amount of fluoride being added is considered to be a trace amount. The precise level of fluoride calculated to be appropriate for each individual community is determined based on that

community's annual average daily temperature[11]. Depending on the precise calculation, each community's water fluoride levels will be adjusted to either 0.7, 0.8, 0.9, 1.0, 1.1, or 1.2 parts per million depending on where the community is located and what type of climate it has[11].

Whichever level of fluoride is determined to be the correct level for an individual community, it bears repeating that only a very small amount of fluoride is ultimately added to the drinking water. It also is important to remember that the optimal amount of fluoride in fluoridated drinking water has been calculated to take into account the fluoride the people get from other sources, like food and drink. Fluoridated drinking water provides only about one-third to one-half the amount of fluoride that an individual should be getting on a daily basis[12].

Is The Amount Of Fluoride In Fluoridated Water Systems Safe?

The amount of fluoride present in fluoridated community water systems is miniscule and has been determined to be safe for all individuals, regardless of age, race, gender, or health status[13]. In other words, community water fluoridation is safe for infants, children, teenagers, young adults, mature adults, and senior citizens[13]. It is safe for everyone, even those with chronic diseases[13]. Community water fluoridation harms no one and it is also effective in preventing dental decay in people of all ages, races, ethnic groups, or socioeconomic backgrounds[13].

Fluoride is like many substances that are required to sustain life and promote health; it is beneficial in small amounts and harmful in large amounts. Such common substances as vitamins, minerals, table salt, food, even water, are helpful in the correct amounts and harmful in excessive amounts. For example, fluoride levels in fluoridated water are so low that an adult would have to consume 660 gallons of fluoridated water in a 2 to 4 hour period in order to get a toxic level of fluoride that would cause death[14]. It is physically impossible for an adult to ever consume that amount of water - the adult would die of other causes long before they were able to accumulate enough fluoride to cause a problem[14]. Likewise, a 12-18 month old child would have to drink 85 gallons of fluoridated water in a 2 to 4 hour period in order to get a toxic level of fluoride that would cause death, again a physical impossibility[14].

In order to suffer chronic skeletal effects of too much fluoride, an adult would have to consume roughly 6 to 14 gallons of fluoridated water every day for 10 to 20 years - again physically impossible for virtually all adults[14]. Most adults drink far less than 1 gallon of water or other liquids a day. Children consume even much lower amounts of liquids than do adults on a daily basis.

A lifetime of drinking water fluoridated at the optimum level (0.7 to 1.2 parts per million) results in **NO** adverse effects to any individual or group of individuals[13]. Thousands of scientific studies have been completed which looked at individuals and groups who used water with optimum levels of fluoride their

entire lives[13]. Lifetime exposure to fluoridated water caused no diseases, no disabilities, nor any other adverse conditions for any group or individuals[13]. Lifetime exposure to fluoridated water only resulted in benefits - lower rates of dental decay and lower health care bills[13].

How Widespread Is The Practice Of Community Water Fluoridation In the United States?

Currently 135 million Americans are benefiting from community water fluoridation[15]. Another 10 million Americans are fortunate enough to live in communities with adequate levels of naturally occurring fluoride[15]. That means that over 62 percent of Americans with access to community water systems currently benefit from fluoridation's continuous protection against dental decay[15]. Unfortunately, only 17 percent of Californians currently enjoy the same decay-preventive benefits of fluoridation, ranking California 47th of 50 states[15].

The 145 million Americans benefiting from fluoridation live in more than 10,500 communities that are served by over 14,300 water systems[15]. In addition, 43 of the 50 largest cities in the United States are currently fluoridating their water systems[15]. With Los Angeles and Sacramento planning to begin fluoridation in 1999, that means that 45 of the 50 largest cities in the U. S. will be fluoridated by year's end. It also means that California, a state whose fluoridation efforts have lagged considerably behind the rest of the nation, will begin to move up in the rankings.

It is also important to remember that communities in the United States have been fluoridating their public water systems since 1945, many since the 1950's and 1960's. We have over 54 years experience adjusting fluoride levels in community water systems.

California Recently Passed Legislation Requiring Fluoridation of Some Community Water Systems. Do Any Other States Require Fluoridation?

Many states have passed legislation requiring community water systems to provide the benefits of water fluoridation for their customers. In addition to California, the states of Connecticut, Delaware, Georgia, Illinois, Minnesota, Nebraska, Nevada, Ohio, and South Dakota require certain communities to fluoridate their public water systems[16,17]. Several other states are currently considering legislation similar to that enacted in California. Both the Commonwealth of Puerto Rico and the District of Columbia have also legislatively mandated fluoridation[16]. Additionally, Kentucky requires statewide fluoridation by administrative regulation[18]. Moreover, many local governments have required fluoridation through laws, regulations, and ordinances.

Who Benefits From The Cost Savings That Result From Fluoridation?

The total cost to the nation for dental treatment services reported in 1997 was $50.6 billion - a substantial amount usually paid for by individuals, employers, government agencies, and insurance companies[19]. California's Denti-Cal program, just one taxpayer supported program that provides dental services to indigent Californians, regularly costs almost $700 million per year. There are a number of ways in which individuals and groups benefit from the costs savings brought on by community water fluoridation, costs which are avoided because of the need for less dental treatment.

For example, taxpayers benefit because public programs paying for dental care for disadvantaged populations require fewer local, state, and federal tax dollars for each person covered by the program[20]. It has been estimated that California taxpayers will save as much as $385 million in the Denti-Cal program alone after only 5 years of fluoridation. Employers benefit because their costs for prepaid dental care fringe benefits for their employees are lower[20]. Employers also avoid the extra costs required when their employees are absent from work due to personal or family visits for dental care[20].

Consumers benefit because they pay lower costs for consumer goods since employers costs for insurance and employee absences is lower[20]. In other words, the cost of doing business in a fluoridated community is lower for employers.

Additionally, all patients benefit in several ways. First, their overall health care bills and insurance premiums are lower in fluoridated communities because there are fewer expensive hospital emergency room visits for dental emergencies, costs of which are usually passed on to everyone able to pay through their health care bills and insurance premiums[20]. Secondly, patients in fluoridated communities avoid having to pay higher health care bills, dental bills, and insurance premiums that often result from the need for physicians, dentists, and hospitals to pass on their extra costs for uncompensated care to those who can pay[20].

It is most apparent that everyone wins with fluoridation. Not only do individuals benefit because of their improved oral health, but they benefit greatly because cost savings resulting directly and indirectly from a community's decision to fluoridate. Fluoridation ultimately promotes: lower health care costs; lower insurance costs; lower tax-supported costs for public programs; lower business costs for employers; and lower costs for consumer goods and services[20].

What Other Impact Is Water Fluoridation Having On Consumer Or Taxpayer Costs?

The extensive use of community water fluoridation in the United States has contributed substantially to decreasing consumer and taxpayer costs for supporting dental education. Because of lower levels of dental decay in the U. S. population, fewer dentists are needed to care for those currently in the health care system. As a result, seven dental schools have ceased operations since 1985[21]. In addition since 1980, enrollment reductions in the remaining dental schools have been equivalent to the closure of another 20 average size dental schools[21].

Community water fluoridation has also had an impact on the costs of dentists' malpractice insurance. Dentists practicing in fluoridated communities pay significantly lower malpractice insurance premiums than dentists practicing in non-fluoridated communities[22]. These lower malpractice insurance rates occur for several reasons. First, since the population suffers from much less decay in fluoridated communities, dentists do not spend as much time providing complicated procedures and therefore are less likely to run into complications. Secondly, dentists also do less general anesthesia and other forms of premedication in fluoridated communities because there are fewer cases of rampant decay in young children.

Who Supports Community Water Fluoridation?

Most legitimate organizations of health professionals and scientists strongly support community water fluoridation. Table 1 provides a list of just a few of the hundreds of organizations that support fluoridation, their year of establishment, and the number of members they represent[23].

Table 1: Examples of Scientific, Technical, and Professional Organizations that Support Community Water Fluoridation[23]

Professional Organization	Established	Membership
American Medical Association	**1847**	**296,000**
American Dental Association	**1859**	**141,000**
American Dental Hygienists' Association	**1923**	**100,000**
American Osteopathic Association	**1897**	**43,000**
American Dietetic Association	**1917**	**70,000**
American Academy of Pediatrics	**1930**	**49,000**
American Academy of Family Physicians	**1947**	**84,000**
American Public Health Association	**1872**	**50,000**
American Nurses Association	**1893**	**180,000**
National Academy of Sciences	**1863**	**2,200****
American Water Works Association	**1881**	**52,000**

**** The 2,200 Members of the National Academy of Sciences include more than 160 Nobel Prize Winners.**

Some other well-known organizations and agencies supporting community water fluoridation include the National Academy of Sciences (established 1863), the U. S. Public Health Service (established 1798), the National Institutes of Health (established 1891), the U. S. Centers for Disease Control (established 1946), and the World Health Organization (established 1946)[23]. These and many additional scientific and professional organizations that recognize the public health benefits of community water fluoridation are listed in the Appendix.

It is important to note that these broadly based organizations represent millions of health practitioners, scientists and other professionals. These credible and respected organizations have also been working to improve the lives of Americans for many years. They are organizations and agencies with established administrative offices, some with state and local chapters, and many whom publish peer-reviewed scientific journals.

Community water fluoridation has also been repeatedly shown to have wide support of the American public[24-25]. Most recently, a national scientific poll taken by the prestigious Gallup Organization documented that 70% of Americans thought community water systems should be fluoridated, 12% did not know, and only 18% thought that community water systems should not be fluoridated[24].

Who Opposes Community Water Fluoridation?

While there is a small, very vocal, minority of the population that opposes the implementation of community water fluoridation, no credible national scientific or professional organization opposes the practice[16,26]. Individuals whom oppose fluoridation are often called 'antifluoridationists.' Most groups that claim to oppose fluoridation have few members, have no history because they have been organized for relatively short periods of time, have no established offices because they often operate out of individuals' homes, and have unfamiliar names and spokespersons[16,26]. These groups have been granted no professional credibility or scientific standing by the scientific or health care communities, publish no accepted scientific journals, and frequently use multiple names in order to appear to have more support for their position than actually exists[16,26-31.] Most of the groups lack any stability, disbanding and reforming periodically as interest in their movement periodically increases or subsides[16,26-31]. The antifluoride groups often publish pseudoscientific propaganda pieces which, when vigorously reviewed and investigated, lack any basis in science[16, 26-31]. Many of these organizations operate exclusively though the Internet where there is little in place to protect consumers from their scientifically invalid claims and their extensive propaganda[29-31].

What Are Some of the Claims Against Fluoridation that are Being Made by Antifluoridationists?

Bone Health: Antifluoridationists often claim that the fluoride from community water systems is bad for bones, that it causes osteoporosis, that it is responsible for increased hip fractures in senior citizens, and that it causes bone cancer. Not only have such claims never been demonstrated in legitimate scientific studies, just the opposite has been shown to be true.

Most studies show no differences in the prevalence of osteoporosis or hip fractures for those people living in fluoridated communities when compared to those living in non-fluoridated communities[32-37]. A recent study actually demonstrated that populations living in fluoridated communities had fewer hip fractures than those living in non-fluoridated communities[37]. An additional study even demonstrated the significant benefits of using fluoride to treat osteoporosis of the spinal column in post-menopausal women[38]. Regarding the allegation that fluoridation causes bone cancer, studies indicate otherwise - that fluoridation is not related to bone cancer[13, 39-40].

Adult Dental Health: Antifluoridationists repeatedly claim that community water fluoridation is only effective in preventing decay in young children. Thankfully, this antifluoridationists' claim is incorrect. Fluoridation benefits people of all ages, whether they are infants, children, adolescents, young adults, middle-aged adults, or the elderly. It is quite clear that adults exposed to fluoridated water experience much less tooth decay than their counterparts who do not have access to fluoridated water[41]. Moreover, substantial benefits to older persons have been documented repeatedly in studies that show a significant decrease in root decay in older Americans[41-45]. Root decay occurs in adults for two reasons. First as people age, the gum tissue recedes so that soft root surfaces become exposed to decay-causing foods in the mouth[41-45]. Secondly as people age or as they become dependent on certain types of medications used to manage chronic health conditions, the flow of saliva tends to become diminished, resulting in what has been termed "dry mouth"[46]. Dry mouth can result in a substantial increase in the likelihood that teeth will decay[46]. Root decay is a serious problem in older Americans and has been shown to be a significant reason for loss of teeth after age 55[47].

Total Fluoride Intake in Children and Adults: Antifluoridationists make a number of bogus claims about total fluoride intake in children and adults. Those few individuals opposed to fluoridation often try to claim that children and adults in the United States routinely get too much fluoride or that fluoride intake for children and adults is somehow increasing. Nothing could be further from the truth. Fluoridation levels for communities have been calculated so as to factor in the amount of fluoride that children and adults get from other sources[4,12,48-52]. Moreover, fluoride consumption for both children and adults in the United States has repeatedly been demonstrated to fall well within a wide margin of safety[12,48-53].

Dental Fluorosis: Antifluoridationists frequently claim that children and adults living in fluoridated communities suffer from an increased amount of dental fluorosis. Again, there are a number of significant problems with these allegations by the antifluoride minority. Firstly, dental fluorosis is a relatively rare occurrence and describes a range of conditions which mostly do not occur in the United States[13]. Fluorosis occurs when children consume more than optimal amounts of fluoride during tooth development[13,54]. Antifluoridationists often exhibit photographs of children living in other countries where serious industrial pollution causes teeth to have permanent brown stains. These brown stains are examples of moderate and severe fluorosis, a condition directly related to industrial pollution and almost never seen in the United States[13,54-55].

The types of fluorosis seen occasionally in the United States are the questionable, very mild, and mild forms[13,55]. Questionable and very mild fluorosis result in changes in teeth so subtle that only trained dental examiners are likely to discover them[13,55]. Mild fluorosis is characterized by a subtle white lacy appearance of the teeth, barely discernable by someone looking closely at the teeth[13,55]. None of these minor forms of fluorosis (questionable, very mild, or mild fluorosis) are considered abnormal or of any health consequence[12-13,55]. Questionable, very mild, and mild fluorosis usually result from very young children swallowing too much fluoride toothpaste or from the inappropriate supplementation with prescription fluoride products (such as (1) when physicians and dentists independently prescribe fluoride supplements or (2) when physicians and dentists prescribe fluoride supplements without checking the fluoride content of the child's water supply so that, in either case, a child gets a "double" dose of fluoride on a daily basis)[12,56-62]. Dental fluorosis also can occur when children consume water with high levels of naturally-occurring fluoride from private wells or community water systems with higher than optimum natural fluoride levels. Community water fluoridation plays almost no role in the development of any of the forms of fluorosis and certainly plays no role in the development of moderate or severe fluorosis.

Secondly, adults cannot get fluorosis[13,56,63]. Fluorosis is caused when high levels of fluoride are consumed during the time that children's teeth are developing under the gums[13,56]. Once all of the permanent teeth have fully formed in children and erupted into the mouth (usually between ages 14-18), fluorosis cannot occur[13,56,63].

Thirdly, the various forms of fluorosis that occasionally occur in the United States are not considered to be any sort of adverse health effect[13]. They are not precursors to any diseases, despite the claims by antifluoridationists, nor are they of any concern other than as a minor issue of esthetics[13]. Moreover, because of the additional fluoride incorporated into the enamel of teeth with questionable, very mild, or mild fluorosis, they are likely to be much more resistant to decay.

Skeletal Fluorosis: Allegations by antifluoridationists that long term consumption of fluoridated water causes skeletal fluorosis are untrue. Skeletal fluorosis occurs after long term consumption (10 years or more) of very high levels of fluoride, amounts which far exceed what one would consume with lifetime exposure to community water fluoridation[12-13]. Extensive studies looking at thousands of lifetime residents who routinely drank water with natural fluoride levels of 4-8 parts per million yielded only 23 cases of an extremely mild condition known as osteosclerosis and no cases of skeletal fluorosis[53,64]. Advanced skeletal fluorosis has not been demonstrated to occur even when people spend their entire lives drinking water with naturally occurring fluoride levels of as much as 20 parts per million[12-13,53,64-65]. Advanced skeletal fluorosis is so rare in the United States that only 5 cases have been confirmed in the last 35 years[12-13]. These 5 cases of advanced skeletal fluorosis were related to industrial exposures of extremely high amounts of fluoride chemicals that occurred over a long period of time and in no way was related to community water fluoridation[12-13].

Reproduction, Infertility, Birth Rates, Genetics, and Sudden Infant Death Syndrome (SIDS): Using the laundry list approach, antifluoridationists allege that fluoride from fluoridated water systems interferes with reproduction, lowers birth rates, causes genetic damage, and is responsible for sudden infant death syndrome (SIDS). Researchers have looked at each of these allegations in depth and have concluded that the allegations are not true[13,53,57,64-85]. Despite scientific evidence to the contrary, antifluoride zealots persist in repeating these false allegations.

Cancer, Heart Disease, Kidney Disease, AIDS, Mental Deficit, and Alzheimers' Disease: Using the same laundry list approach, antifluoride activists also attempt to induce panic in the public by claiming that fluoride from fluoridated water causes such dreaded diseases as cancer, heart disease, kidney disease, AIDS, and Alzheimers' Disease. These claims have resulted in the conduction of a substantial amount of scientific research, all of which demonstrates that the antifluoridationists' claims are without substance[12-13,53,84-97.] Again, as with the previously mentioned laundry list of alleged diseases attributed to community water fluoridation, scientific evidence counters the false allegations of the antifluoride minority.

Fluoride Status in Europe: Antifluoridationists often claim that "only the United States fluoridates its community water supplies," or that "98% of Europe is fluoride free," or even that "Europe has banned fluoride." All three of these claims are false. The World Health Organization strongly recommends the use of community water fluoridation where ever it is technologically feasible[23,98]. The phrase "technologically feasible" means that the country has one or more public water systems: (1) that are capable of adding fluoride to the drinking water; (2) has drinking water systems that are usable, safe, and dependable; and (3) that the country's water systems employ qualified water plant operators who can ensure that optimum levels of fluoride will continue to be maintained.

Currently approximately 60 countries practice community water fluoridation, providing the benefits of optimally fluoridated drinking water to more than 360 million people[98-99]. While many of these countries which fluoridate their community water systems are in Europe, some European countries provide their populations with fluoride through alternative means. For example, France and Switzerland add fluoride to table salt to ensure that adequate amounts of fluoride are made available to all of their populations, although one community water system in Switzerland is fluoridated. Salt fluoridation was chosen because of inherent difficulties in using water fluoridation in communities with extremely complex water distribution systems.

Other countries, especially Norway, Sweden, Finland, Denmark, and the Netherlands utilize their extensive national health care systems to deliver fluoride supplements to all children, as well as to provide routine topical fluoride applications in their public clinics. Many Eastern European community water systems have stopped fluoridation (some have even shut down their water treatment plants altogether) only because of their current financial difficulties and will likely be resuming fluoridation once their economies permit upgrading of worn out and outdated facilities. Not a single European country has "banned" fluoridation as alleged by America's antifluoride minority.

U. S. Environmental Protection Agency: Some antifluoridationists have claimed that the U. S. Environmental Protection Agency (USEPA) has banned fluoridation in the United States. This allegation serves as yet another example of the use of false and misleading statements by the antifluoride minority. First of all, the USEPA continues to support the use of community water fluoridation in public water systems in the United States, all of which fall under the Agency's regulations. As recently as 1997, a USEPA spokesperson reconfirmed that "recent reviews of the available toxicity data by the Department of Health and Human Services (1991) and the National Research Council (1993) support EPA's policy and the use of optimal fluoridation"[100]. An official letter from the USEPA that is included in the current Code of Federal Regulations further emphasizes that "fluoride in children's drinking water at levels of approximately 1 mg/l [1 part per million] reduces the number of dental cavities"[101].

Toothpaste Warning Label: Recently, warning labels have been showing up on fluoride-containing toothpastes. Although unrelated in any way to community water fluoridation, there are several reasons why this has happened. First of all, most toothpastes sold in the United States contain fluoride at levels that are between 1,100 and 1,600 parts per million. Since toothpaste fluoride levels are more than 1,000 times higher than fluoride levels in community water systems, very young children swallowing substantial amounts of toothpaste could end up with mild to moderate fluorosis[58]. Mild to moderate fluorosis, while not being an adverse health effect, could result in some slightly stained permanent teeth[58]. As discussed previously, older children and adults can not get fluorosis, although they are less likely to swallow large amounts of toothpaste anyway[13,56,63]. While there is the hypothetical possibility that a very small child

could intentionally swallow enough fluoride toothpaste to become acutely ill, there are other chemical constituents in toothpaste that would likely cause the child to vomit long before they swallowed enough fluoride to be harmful[102].

In the U. S., any consumer products companies making health claims for their products, even if their products are sold over the counter, come under the regulatory authority of the U. S. Food and Drug Administration (FDA)[102]. The FDA requires that all over-the-counter products include warning labels for every such product to explain to the public what might happen if the product is consumed in larger quantities than recommended by the manufacturer[102]. While the FDA began enforcing this requirement a number of years ago by selectively imposing the regulation on various categories of consumer products, they only recently began enforcing the requirement on toothpastes[102]. It is important to note that there never has been a documented case of serious injury or death from children swallowing toothpaste[102]. Furthermore, the statewide California Poison Control System confirms that NO child has ever been referred to a hospital for toothpaste related illness as a result of a call to one of California's regional poison control centers[102]. The Director of the San Diego Division, California Poison Control System, himself a board certified applied toxicologist, stated:

> ***Equally convincing are the numerous studies that have shown that fluoridation of drinking water is safe. From a toxicological perspective, many epidemiologic studies have been performed that show convincingly that fluoridation of drinking water produces no harmful effects.***[103]

SUMMARY AND CONCLUSIONS

Community water fluoridation has served the American public extremely well as the cornerstone of dental caries prevention activities for more than 54 years. The dental health and general health benefits associated with the consumption of water-borne fluorides have been documented for over 100 years. Ongoing research, often conducted in response to the repeated allegations by those opposed to fluoridation, continues to confirm the safety, effectiveness, efficiency, cost-effectiveness, and environmental compatibility of community water fluoridation.

Fluoridation also continues to be acclaimed as an important contributor to the health of the nation, most recently being named as one of the 20th Century's ten greatest public health achievements[104]. Dr. David Satcher (currently the Assistant Secretary for Health and the Surgeon General of the United States) recently reconfirmed the support of his office for community water fluoridation[105]. Dr. Satcher's comments were included in a congratulatory letter to the chair of California's Fluoridation Task Force regarding the positive decision of the City of Los Angeles to initiate fluoridation[105]. Moreover, the deans of California's five

dental schools recently issued a signed Position Statement on Community Water Fluoridation (1999) that stated in part:

> ***As the dean of a California dental school, I would like to state my personal and professional position on the need to fluoridate California's Community water systems. Community water fluoridation, without a doubt, is the greatest public health benefit related to decay prevention. It is a safe, effective and cost effective way to make this preventive measure available to everyone in a community. Quite simply, it is a measure which I would advocate to my family, friends and colleagues without question or concern."***[106]

The adoption of community water fluoridation by local communities and state legislatures represents an excellent example of good public policy. Communities throughout the United States continue to exhibit sound decision-making and evidence their continued trust and faith in science and the health professions by adopting fluoridation. The acceptance of community water fluoridation by public officials ensures that all citizens of a community, regardless of age, race, ethnic background, religion, gender, educational status, or socioeconomic level, receive the same substantial dental disease prevention benefits currently available to the 145 million Americans on fluoridated water systems.

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APPENDIX I: National & International Organizations that Recognize the Public Health Benefits of Community Water Fluoridation for Preventing Dental Decay*

***[From: *Fluoridation Facts,* © 1999, American Dental Association]**

Academy of Dentistry International
Academy of General Dentistry
Academy of Sports Dentistry
Alzheimer's Association
American Academy of Allergy, Asthma & Immunology
American Academy of Family Physicians
American Academy of Oral & Maxillofacial Pathology
American Academy of Pediatrics
American Academy of Pediatric Dentistry
American Academy of Periodontology
American Association for the Advancement of Science
American Association for Dental Research
American Association of Community Dental Programs
American Association of Dental Schools
American Association of Endodontists
American Association of Oral & Maxillofacial Surgeons
American Association of Orthodontists
American Association of Public Health Dentistry
American Cancer Society
American College of Dentists
American College of Physicians
American Society of Internal Medicine
American College of Prosthodontists
American Council on Science & Health
American Dental Assistants Association
American Dental Association
American Dental Hygienists' Association
American Dietetic Association
American Federation of Labor / Congress of Industrial Organizations
American Hospital Association
American Medical Association
American Nurses Association
American Osteopathic Association
American Pharmaceutical Association
American Public Health Association
American School Health Association
American Society of Clinical Nutrition
American Society of Dentistry for Children
American Society for Nutritional Sciences
American Student Dental Association
American Veterinary Medical Association
American Water Works Association
Association for Academic Health Centers
Association of Maternal & Child Health Programs
Association of State & Territorial Dental Directors
Association of State & Territorial Health Officials
British Dental Association

British Fluoridation Society
British Medical Association
Canadian Dental Association
Canadian Dental Hygienists Association
Canadian Medical Association
Canadian Nurses Association
Canadian Paediatric Society
Canadian Public Health Association
Chocolate Manufacturers Association
Consumer Federation of American
Delta Dental Plans Association
European Organization for Caries Research
FDI World Dental Federation
Federation of Special Care Organizations in Dentistry
Academy of Dentistry for Persons with Disabilities
American Association of Hospital Dentists
American Society for Geriatric Dentistry
Health Insurance Association of America
Hispanic Dental Association
International Association for Dental Research
International Association for Orthodontics
International College of Dentists
Institute of Medicine
National Academy of Sciences
National Alliance for Oral Health
National Association of County & City Health Officials
National Association of Dental Assistants
National Confectioners Association
National Council Against Health Fraud
National Dental Assistants Association
National Dental Association
National Dental Hygienists' Association
National Down Syndrome Congress
National Down Syndrome Society
National Foundation of Dentistry for the Handicapped
National Kidney Foundation
National PTA
National Research Council
Society of American Indian Dentists
The Dental Health Foundation (of California)
U.S. Department of Defense
U.S. Department of Veterans Affairs
U.S. Public Health Service
U.S. Centers for Disease & Prevention (CDC)
U.S. Health Resources & Services Administration (HRSA)
U.S. Indian Health Service (IHS)
National Institute of Dental & Craniofacial Research (NIDCR)
World Federation of Orthodontists
World Health Organization

APPENDIX II: Partial List of California Organizations and Agencies that Recognize the Public Health Benefits of Community Water Fluoridation for Preventing Dental Decay**

**[From California Dental Association and California Department of Health Services]

American Academy of Pediatrics - California Division
California Chamber of Commerce
California Children NOW
California Conference of Local Health Officers
California Department of Health Services
California Dental Association
California Dental Hygienists' Association
California Fluoridation NOW
California Fluoridation Task Force
California Medical Association
California Public Health Association - North
California Rural Indian Health Board
California Schools of Dentistry
- **University of California, San Francisco**
  - **Dr. Charles N. Bertolami, Dean**
- **University of the Pacific**
  - **Dr. Arthur A. Dugoni, Dean**
- **Loma Linda University**
  - **Dr. Charles J. Goodarce, Dean**
- **University of Southern California**
  - **Dr. Howard M. Landesman, Dean**
- **University of California at Los Angeles**
  - **Dr. No-Hee Park, Dean**

Delta Dental Plan of California
Dental Health Foundation (of California)
Los Angeles Citizens for Better Dental Health
Older Women's League
Sacramento District Dental Society
Southern California Public Health Association

APPENDIX III: BIBLIOGRAPHY (Suggested Readings)

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APPENDIX IV: SELECTED WORLD WIDE WEBSITES WITH SCIENTIFICALLY VALID FLUORIDATION INFORMATION

CALIFORNIA SITES:

California Dental Association
http://www.cda.org/public/index.html

California Fluoridation Now
http://www.deltadentalca.org/flo/flo_spr98.html

Delta Dental Plans of California
http://www.deltadentalca.org/sub/sub_fluor.html

Dental Health Foundation (of California)
http://www.dentalhealthfoundation.org/

Los Angeles Citizens for Better Dental Health
http://www.dhs.co.la.ca.us/phps/phwpost/watrflrd.htm

Sacramento District Dental Society
http://www.sdds.org/fluorida.htm

OTHER STATES' SITES:

Washington State Children's Alliance
http://www.childrensalliance.org/teeth/fluorida.htm

Washington State Dental Association
http://www.wsda.org/public/consumers/factsheets2.cfm?id=34

Washington State Oral Health Coalition
http://www.childrensalliance.org/teeth/washingt.htm

NATIONAL SITES:

American Academy of Family Physicians
http://www.aafp.org/policy/50.html

American Dental Association
http://www.ada.org/consumer/fluoride/fl-menu.html

American Society for Nutritional Sciences and the American Society for Clinical Nutrition
http://www.faseb.org/ain/fluoridation.html

National Center for Fluoridation Policy & Research
http://fluoride.oralhealth.org/

U. S. Centers for Disease Control, Division of Oral Health
http://www.cdc.gov/nccdphp/oh/

U. S. National Institutes of Health, National Center for Dental & Craniofacial Research
http://www.cyberdentist.com/fluoride.htm#Q1
http://www.nidr.nih.gov/flouride.htm

U. S. Public Health Service (Report on Fluoride Benefits & Risks)
http://www.cda.org/public/pubhsrvc.html

INTERNATIONAL SITES:

British Fluoridation Society
http://www.derweb.ac.uk/bfs/index.html

Calgary (Alberta, Canada) Regional Health Authority
http://www.crha-health.ab.ca/pophlth/hp/fluoride/

APPENDIX V: STATEMENT FROM THE CALIFORNIA POISON CONTROL SYSTEM

From: California Poison Control System
Anthony S. Manoguerra, Pharm.D., ABAT
Director, San Diego Division, California Poison Control System
Professor of Clinical Pharmacy & Pediatrics
Diplomate, American Board of Applied Toxicology

To: To Whom It May Concern

Date: March 30, 1989

What Follows is the Transcribed Contents of Dr. Manoguerra's Letter:

As with nearly all substances, fluoride is toxic in large doses and safe and therapeutic in small doses. I have reviewed the evidence for the safety of fluoridation of water along with poison center data relative to fluoride ingestions in children. The California Poison Control System has established a threshold of 10 mg/kg of fluoride as the acute dose that a child must ingest before a referral to a health care facility is necessary. This amounts to approximately 100 sodium fluoride tablets (1 mg fluoride per tablet), 90 to 100 grams (3 ounces or more) of fluoride-containing toothpaste or 100 liters of fluoridated water. These amounts are so large that they are rarely, if ever, ingested. Chronic ingestion of fluoride in the quantities found in fluoridated water plus typical food and beverage sources and toothpaste are not associated with adverse health effects. There is no evidence that fluoride ingestion is related to an increased incidence of cancer.

There is strong and convincing evidence that fluoridation decreases the incidence of dental caries in children. Recent studies have shown that California children suffer an excess of dental caries because of inadequate fluoridation programs. This results in substantial and unnecessary dental work and the resultant costs associated with the repair of children's teeth. Equally convincing are the numerous studies that have shown that fluoridation of drinking water is safe. From a toxicologic perspective, many epidemiologic studies have been performed that show convincingly that fluoridation of drinking water produces no harmful effects.

I appreciate the opportunity to provide this input and ask that if you have any questions, please contact me.

Sincerely,

s/ Anthony S. Manoguerra, Pharm. D., ABAT

APPENDIX VI: STATEMENT FROM DR. DAVID SATCHER, ASSISTANT SECRETARY FOR HEALTH AND SURGEON GENERAL OF THE UNITED STATES REGARDING THE FLUORIDATION OF LOS ANGELES

From: David Satcher, M.D., Ph.D., Assistant Secretary for Health and Surgeon General of the United States

To: Timothy R. Collins, D.D.S., M.P.H., Chairman, California Fluoridation Task Force

Date: October 19, 1998

What Follows is the Transcribed Contents of Dr. Satcher's Letter:

I have just become aware of the decision by the City of Los Angeles to initiate fluoridation of their drinking water by the end of the year. This is indeed a great public health advancement. As you know, oral diseases and their prevention remain a high priority for the Department, and I am in the process of completing the first Surgeon General's report on oral health. Fluoridation was included in our National Healthy People 2000 objectives and has been proposed for retention in the objectives for 2010.

Fluoridation remains an ideal public health measure based on the scientific evidence of its safety and effectiveness in preventing dental decay and its impressive cost-effectiveness. Further, one of my highest priorities as Surgeon general is reducing disparities in health that persist among our various populations. Fluoridation holds great potential to contribute toward elimination of these disparities.

I am pleased to join previous Surgeons General in acknowledging the continuing public health role for community water fluoridation in enhancing oral health protection for Americans. Congratulations to you, the task force, and the health organizations that are supporting your efforts. Your success in Los Angeles and other California communities in need of fluoridation will make a significant contribution toward achieving our national goal.

Sincerely yours,

s/ David Satcher, M.D., Ph.D.

APPENDIX VII: POSITION STATEMENT ON COMMUNITY WATER FLUORIDATION (FROM THE DEANS OF CALIFORNIA'S FIVE DENTAL SCHOOLS)

From: Charles N. Bertolami, D.D.S., D.Med.Sc.
Dean, School of Dentistry; University of California, San Francisco

Arthur A. Dugoni, D.D.S.
Dean, School of Dentistry; University of the Pacific

Charles J. Goodarce, D.D.S., M.S.D.
Dean, School of Dentistry; Loma Linda University

Howard M. Landesman, D.D.S.
Dean, School of Dentistry; University of Southern California

No-Hee Park, D.M.D., Ph.D.
Dean, School of Dentistry; University of California at Los Angeles

What Follows is the Transcribed Contents of the Deans' Position Statement:

As the dean of a California dental school, I would like to state my personal and professional position on the need to fluoridate California's community water systems. Community water fluoridation, without a doubt, is the greatest public health benefit related to decay prevention. It is a safe, effective and cost effective way to make this preventive measure available to everyone in a community. Quite simply, it is a measure which I would Advocate to my family, friends and colleagues without question or concern.

The need to fluoridate California's community water systems is obvious. California currently ranks 48th in the nation related to community water system fluoridation. This translates to only 17 percent of Californians benefiting from perhaps the most safe, efficient and cost effective means of preventing tooth decay. Recent studies indicate the decay rate of California school children to be as much as 50 percent higher than the national average. Sixty percent of Californians mistakingly (Sic) think that their water is already optimally fluoridated. Fluoride is a naturally occurring element found in trace amounts in most water systems. It has been scientifically proven that by adjusting the concentration of fluoride in community water systems the therapeutic effect for decay prevention will be achieved. Years of studies in communities with naturally occurring optimal levels of fluoride as well as those communities with adjusted levels have proven to be safe and effective. Many communities have voluntarily fluoridated for over forty years with no adverse health effects.

With the passage of AB 733 (Speier) in 1995, California was given a tremendous opportunity to act positively regarding this public health measure. This legislation, however, is currently an unfunded mandate. The political will of a community to support fluoridation is important. Community water fluoridation is estimated to cost about 50 cents per person annually. By comparison, a single filling costs between $50-$100. This means that for every dollar spent on fluoride a savings of $100 in dental care would be realized. This also means that fewer anxiety-provoking visits to the dentist for fillings or other treatment would be needed.

Many communities across the nation have been studied for the decay-reducing effects of water fluoridation, and it is apparent that this public health measure is beneficial. Studies conducted by the National Institute of Dental Research and the Centers for Disease Control indicate a 30-60 percent reduction in tooth decay after implementation of community water fluoridation. Dental decay (caries) is, in fact, a disease that can be prevented or minimized by consuming drinking water that is fluoridated at an optimal level. This optimal level is monitored by state-of-the-art equipment and highly trained water engineers within a community's water system.

Extensive research has been conducted on the safety of community water fluoridation. When present at optimum levels in community water systems, fluoridation is indeed safe. The American Dental Association, the U. S. Public Health Service, the National Institute of Dental Research and independent university research have shown that, although a few individuals continue to object to fluoridation, there is no scientific basis for doubting the medical safety, effectiveness and practicality of community water fluoridation as a public health measure for preventing dental decay.

Best wishes for better dental health,

s/ Charles N. Bertolami, D.D.S., D.Med.Sc.
s/ Arthur A. Dugoni, D.D.S.
s/ Charles J. Goodarce, D.D.S., M.S.D.
s/ Howard M. Landesman, D.D.S.
s/ No-Hee Park, D.M.D., Ph.D.